PSYCHOLOGICAL LITERATURE.

I.—NERVOUS SYSTEM.

Zur Geschichte des Gehirns, sowie central und peripherischen Nervenbahnen beim menschlichen Embryo. WILHELM HIS. XIV Band d. Abhandlungen d. Koenigl. Saechsischen Gesellschaft der Wissenchaften, No. VII, 1888.

Die Entwickelung der ersten Nervenbahnen beim menschlichen Embryo. Uebersichtliche Darstellung. WILHELM HIS. Arch. f. Anatomie u. Physiologie, 1887.

Under the second title His has given a condensed presentation of his view regarding the development of the nerve tracts in man. The first paper is more elaborate, and an idea of the work can be best gotten from considering certain portions of that. In the study of such questions, schematizing is the great pitfall that the author must avoid, according to His, and certainly he, as much as any one, has developed the technique by which such a danger may be escaped. The artistic figures which accompany the paper are actual reconstructions from the sections, accurate in every detail, for where the sections cease to be clear the figures stop.

It is the changes occurring between the end of the first and end of the second month which are here considered. The opening section deals with the changes in the form of the brain up to the end of the second month, the relative development of the different vesicles and the variations in flexure being shown by illustrations. At the end of this period the hemispheres have just covered the interbrain, and the cerebellum is commencing to grow out. A cross-section of the brain tube in the earlier stages is essentially like that of the spinal cord. It is laterally compressed, with thick side walls connected ventrally and dorsally by two thinner layers of cells. The dorsal wall is the dorsal plate (*Deckplatte*); the ventral, the ventral plate (*Bodenplatte*). The lateral walls on each side are divided through their entire length into two portions, ventral and dorsal, by a slight furrow visible on their mesial surface in cross-section. The more ventral portion on each side is the fundamental plate (*Grundplatte*), and the dorsal, the wing plate (*Flügelplatte*). It is necessary to introduce these terms, since the fate of the wing plate and fundamental plate are points of special interest. Without the figures, a description of the changes which this typical form undergoes in the different vesicles would be of no value. This type can be followed even into the forebrain, where the ventral plate becomes the infundibulum, the fundamental plates the corpora striata, and the wing plates take part in the formation of the hemispheres, while the dorsal plate helps to form the inner wall of the anterior portion of the hemispheres.

The histological changes follow the same order in the brain region

that they do in the spinal cord. It is the region of the medulla, and specially the caudal portion of it, that leads in the development, a fact that can be brought into connection with the highly complicated character of this region and its fundamental importance to the organism. The relation of the cranial nerves is very interesting. The motor nerves of the spinal cord are found to arise from the cells in the fundamental plate. All the motor cranial nerves also arise from cells in the fundamental plate. In the lower cervical region, however, this solid nucleus of cells, which has thus far run the entire length of the cord, separates into two portions, a dorsal and ventral, the former giving rise to the accessory fibers which emerge along the line of juncture between the fundamental and wing plate. This double origin is carried up into the cranial nerves, and one set are found arising plainly from what is a continuation of the ventricular nucleus, while the other is equally plainly a continuation of the accessory. To the former belong the hypoglossal, abducens, trochlearis and oculo-motor, while to the latter, the dorsal, belong the motor portion of the vagus, glossopharyngeus, facialis, and the motor portion of the trigeminus, at least in part. The sensory roots also are similar to the spinal in their mode of origin. For the spinal cord the sensory roots arise from bipolar ganglion cells which form the spinal ganglia that lie outside of the nerve tube. As His points out, there is some reason to think that in the adult certain fibers in the posterior roots are unconnected with these ganglion cells, but he adds that he has no evidence at all on the point from his embryos, and is thus compelled to ignore the question for the present. The sensory cranial nerves arise also from outlying ganglia. These are four in number—the trigeminal, the acustico-facial, the glossopharyngeal, and the vagus masses. In development all these masses undergo differentiation which cannot here be followed, but they all agree in sending bundles of fibers towards the nerve tube, which then apply themselves to the wing plate, and turning, run longitudinally. There is this difference between the bundles thus formed, that those arising from the spinal nerves turn so as to run cephalad, while those formed by the cranial nerves run caudad and form the "ascending" roots of the anatomists, for their respective nerves. It will be further seen that there are no sensory nuclei in the nerve tube which are at all homologous with the motor nuclei, the connection of the sensory fibers being far less localized. It is also interesting to consider that since the bundles of sensory fibers from the spinal nerves form the rudiments of the posterior columns, so the roots of the sensory cranial nerves, being homologous with them, form what may be considered as the prolongation of these posterior columns. From all of which it follows that cranial and spinal nerves are fundamentally similar in their origin and development.

In next describing the manner in which the peripheral nerves grow out, His finds many illustrations of purely mechanical influences controlling their course, division, etc. Those who are at all familiar with the labors of this author will recognize that he has here a peculiarly favorable field in which to develop his view of the very great importance of mechanical causes in controlling the form of our body and its organs. In discussing this point he specially emphasizes the importance of the sequence of events. For example, an outgrowing nerve stem splits on pressing against a cartilage that

lies in its path. Suppose the cartilage had not developed until after the nerve had grown quite past this point; it would then be easily conceivable that the form of the nerve stem might have been quite different. The sequence of events becomes, then, a matter of prime importance, and he summarizes it for this period as follows: 1. Formation of the myelospongium (the non-nervous framework); 2. development of axis cylinders from the nerve cells; 3. formation of first nerve trunks leaving the center; 4. development of the outlines of the skeleton; 5. gradual growth of the nerve trunks towards the periphery; 6. development of the protoplasmic processes from the cells in the central system.

For brain anatomy the paper is specially important; for many current views regarding the nature and significance of the cranial nerves will find in it their best evidence, as well as their most serious difficulties.

Ueber die Bestandtheile des vorderen Kleinhirnschenkels. W. Becterew. His and Braune's Archiv, 1888, No. 2 bis 4, S. 124.

On the basis of embryological studies Becterew describes, in the superior peduncle of the cerebellum, four bundles of fibers which acquire their medullary sheaths at different periods. A transverse section between the corpora quadrigemina and the cerebellum in the adult shows dorso-laterally on either side of the middle line the conspicuous crescent formed by the fibers of the superior peduncle. Referring to such a section, the author describes these four bundles as occupying the following positions: (1.) The first is earliest developed, and is found in the sharp ventral angle of the crescent. It does not arise from the cerebellum, but is lost in the principal nucleus of the vestibular nerve. Small in extent, it passes as far as the cephalic edge of the pons where the fibers cross the middle line as a commissure. This is the ventral bundle. (2.) The second in order is the dorsal bundle which forms the dorsal portion of the crescent, and arises from the nucleus fastigii and the cortex of the vermis on the corresponding side. (3.) Between these two, on the lateral curve of the crescent, appears the so-called middle bundle, the fibers of which mix partially with those of the bundles just described. In the cerebellum these fibers are in connection with the nuclei globosus and emboliformis. (4.) The last to develop is the one filling the remaining space along the mesial curve of the crescent, the inner bundle. It arises in part from the corpus dentatum and the cortex of the cerebellar hemispheres. The three bundles last named form the superior peduncle proper, and crossing the middle line end in the cells of the red nucleus. Becterew regards these three as a physiological continuation of the bundles which form the inferior peduncle of the cerebellum.

The Development of the Peripheral Nervous System of Vertebrates (Part I, Elasmobranchii and Aves). J. Beard. Quart. Journ. Micr. Sci., Vol. XXIX, 1888, pp. 153–227, plates 16-21.

This elaborate paper is a continuation of the author's morphological studies upon the development of the peripheral nervous system of vertebrates, and is very largely discussional. According to Beard, the spinal ganglia of vertebrates are formed as differentiations of the inner layers of the epiblast just without the limits